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MOTORCYCLE SOUND SYSTEM**1. Field of the Invention:**

The present invention relates to motorcycle sound systems. In particular, the present invention relates to a sound system having audio components and external speakers adapted to the requirements of the electrical system of a sportsbike-type motorcycle.

2. Background of the Invention:

For many years, there existed no audio components that were designed specifically for motorcycles. The only music options available for motorcycle riders were either to wear headphones coupled with a portable personal radio-receiver or to somehow carry or attach to the motorcycle a small radio with a loudspeaker. Neither of these options yielded satisfactory results; riders wearing headphones had impaired perception of traffic conditions, and riders using small radios with loudspeakers were dissatisfied with sound quality and volume.

Consequently, in order to meet riders' needs, there have been modest developments in the field of motorcycle sound systems. For example, helmet-mounted speaker systems have been invented to take the place of headphones. U.S. Pat. Nos. 4,524,461; 5,119,505; 5,243,659; and 6,075,857 disclose motorcycle helmets that contain integrated speakers suitable for listening to music as an element of the invention. Unfortunately, these improvements cannot meet the needs of multiple listeners or the needs of riders who are not wearing helmets.

Further, handlebar- or gas-tank- mounted devices have enabled riders to more easily carry their radios and loudspeakers. U.S. Pat. Nos. 4,436,350; 4,754,901; 4,756,454; 4,856,364; 4,974,759; 4,981,243; 5,001,779; and 5,771,305 disclose assemblies that allow small radios with loudspeakers to be carried on bicycles, scooters, or motorcycles. However, the sound quality and volume are generally unsatisfactory. In several of these inventions, the device either obscures the speedometer and other gauges, or covers the gas-tank opening, making refueling more difficult. Further, these devices are plainly visible when mounted, and thus vulnerable to theft or vandalism.

Also, there have been developments in speaker technology, allowing riders to include speakers into the existing body of the motorcycle. U.S. Pat. Nos. 4,445,228; 4,600,208; and 4,768,870 disclose systems for integrating speakers inside the rearview-mirrors of a motorcycle and for distributing speakers on a motorcycle to enhance sound quality and availability. While these inventions are important developments toward better motorcycle sound systems, they do not provide a fully-integrated system that avoids all of the aforementioned difficulties.

In addition, custom manufacturing companies have been able to develop sound systems for motorcycles having significant available storage space. For example, on motorcycles with "saddlebags," stereo systems have been mounted inside this available space, and speakers have been mounted on the handlebars. While this option seems to solve most of the difficulties experienced by motorcycle riders desiring a sound system, motorcycles that lack substantial storage space are, disappointingly, excluded from enjoying this option.

Currently, only riders of large, cruiser-type motorcycles that have electrical systems capable of supporting audio components can enjoy a sound system. Unfortunately, the very popular, smaller sportsbike-type motorcycle cannot support such a system, due to limited

available space and limited electrical output. Presently, a sportsbike rider's only recourse is the use of audio components that are mounted on the exterior of the sportsbike subsequent to manufacture. The most popular alternative available for sportsbike riders is an aftermarket commercially-available strap-on tank bag that carries portable audio components, manufactured
5 by E & E Products under the trademark TANKTUNES. However, just as in the aforementioned inventions, this alternative has several disadvantages. First, the bag covers the gas-tank and thus must be removed each time the motorcycle requires refueling, then reattached for subsequent use. Second, the bag is visible to passers-by while the motorcycle is parked; unless the bag is removed each time, the audio components are vulnerable to theft or vandalism. Lastly, the bag
10 gives the motorcycle a cheap, makeshift appearance. As a result there exists considerable need for a built-in sound system for motorcycles, and for sportsbike-type motorcycles in particular.

Moreover, the prior art has taught that installing a sound system in a motorcycle presents difficulty in assembly, and experience has shown that a system restricted to the limited electrical capabilities of a sportsbike lacks "punch," or output at dynamic highs. In custom-designed
15 automobile-based sound systems, individuals have been known to use capacitors in connection with the vehicle's battery to provide punch. These capacitors are stored in the trunk of the vehicle. However, sound systems in vehicles have been well known for decades. Sound systems in sportsbikes, however, are believed to be not only completely unknown but also contrary to the prevailing practice of minimizing the electrical demand on these types of motorcycles because of
20 the limitations of their electrical power source. Thus, there exists considerable need for a motorcycle sound system that is easily incorporated into the design of the motorcycle and is capable of providing the "punch" desired by listeners.

SUMMARY OF THE INVENTION

According to its major aspects and briefly described, the present invention is a sound system for a motorcycle. In particular, the present invention is a sound system for sportsbike-type motorcycles. The present sound system is incorporated into existing structures of sports bikes and uses a capacitor in connection with the vehicle's battery to deliver more effective dynamic highs or "punch" to the amplifier.

An important feature of the present invention in the preferred embodiment is the use of a capacitor in electrical connection with the battery and amplifier to provide audio response during dynamic highs; as a result, the sound does not lack "punch." The capacitor can be incorporated easily into existing structure without adding undue weight and with no burden on the electrical system of the sportsbike.

Another feature of the present invention is the use of existing structures on a sportsbike to house the components of the sound system. Unlike touring bikes, sportsbikes are designed for speed and agility. The aerodynamics cannot be compromised. When integrated in a sportsbike in accordance with the present invention, the present sound system does not alter the outward appearance of the motorcycle and thus cannot be observed by passers-by; the present invention is therefore less vulnerable to theft or vandalism. Nor are the profile and aerodynamics, and therefore performance characteristics, changed by the integration of the sound system with a sportsbike.

Another feature of the present invention is that the components can be packaged in a cowling that can then be sold in the aftermarket as an option. The sound system-housing cowling can then be mounted without significant modification of the motorcycle, since the

cowling used to contain the system preferably has the same profile as commercially available cowlings from the manufacturer of the sportsbike.

Other features and their advantages will be apparent to those skilled in the field of motorcycle sound systems from a careful reading of the Detailed Description of Preferred Embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings,

Fig. 1 is a schematic of the system 12 and included components of a motorcycle sound system according to a preferred embodiment of the present invention.

Fig. 2 is a side view of a sportsbike-type motorcycle 10 equipped with a motorcycle sound system according to a preferred embodiment of the present invention.

Fig. 3 shows the placement of the various elements of a motorcycle sound system 12 according to a preferred embodiment of the present invention on a sportsbike-type motorcycle.

Fig. 4 shows the placement of the various elements of a motorcycle sound system 12 according to a preferred embodiment of the present invention within cowling 34.

Fig. 5 is a top view of a sportsbike-type motorcycle 10 equipped with a motorcycle sound system according to a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The invention is a sound system that can operate within the structural design and the power requirements of the electrical system of a sportsbike-type motorcycle. Because sportsbikes are designed to be faster and more maneuverable than traditional cruising-type

motorcycles, they are smaller, lighter, more aerodynamic and carry fewer accessories. These characteristics dictate a limited electrical-power system. It is these limitations on space and electrical power that makes equipping a sportsbike with a full-featured integrated sound system non-obvious in-and-of-itself and difficult in practice.

5 Normally, the electrical system of a sportsbike is powered by a 12 V battery that is recharged during operation by the sportsbike's alternator. The battery serves to power any electrical devices carried by the sportsbike and is sufficient to provide adequate electrical power for devices that require only a small amount of power. However, the power requirement of a sound system using external speakers and an amplifier is too great for the battery and alternator during instances of peak power demand, also referred to as dynamic highs. Because of the lack of adequate power for the amplifier and speakers during dynamic highs, the resulting sound would lack "punch." Music that lacks "punch" during instances of peak power demand sounds "flat."

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307/ 48, 59, 66, 109
15 The present invention overcomes this inadequacy through the use of a capacitor. A capacitor is a device used to store excess electrical energy. In the most preferred embodiment of the present invention, a capacitor is charged by the battery and, during operation, the alternator. When the sound system's required output exceeds the maximum battery output, the capacitor can provide the additional required electricity during dynamic highs. As a result, the sound does not sound flat or lack "punch."

20 Referring now to Fig. 1, there is shown a schematic of the system components of a motorcycle sound system according to the present invention and generally indicated by reference number 12. System 12 includes a battery 14 in electrical connection with a capacitor 16. Normally, battery 14 is a standard commercially-available 12 V battery for use with motorcycles.

The capacitor used in the most preferred embodiment of the present invention is preferably a 1 Farad capacitor, but the present invention is not limited to 1 Farad of capacitance or to a single capacitor. System 12 also includes at least one audio component 18. In a preferred embodiment, audio component 18 is an FM stereo receiver; however, 18 can also be a compact disc player, an audio cassette player, a minidisc player, a digital audiotape player, or an MP3 player. Moreover, the invention is not limited to a single audio component. In addition, audio component 18 can be operably connected to an auxiliary audio component 20. Auxiliary audio component 20 can also be an FM stereo receiver, a compact disc player, an audio cassette player, a minidisc player, a digital audiotape player, or an MP3 player. Alternatively, the auxiliary audio component 20 can be an equalizer. Both audio component 18 and auxiliary audio component 20, if present, are grounded to the frame of sportsbike 10.

Another important feature of the present invention is amplifier 22. Amplifier 22 is operably connected with audio component 18; normally, the means for communicating electrical signals is via audio cable, but this is not limiting. Amplifier 22 is necessary to increase the power of the signal from audio component 18 in order to drive a signal-to-audio transducer, such as speakers 24. As with audio component 18 and auxiliary audio component 20, amplifier 22 is grounded to the frame of motorcycle 10. Speakers 24 are preferably incorporated into existing structures on the motorcycle 10, for example, in the rearview-mirror casings 26, the turnsignal casings 28, the brakelight casings 30, the fairings 32, the cowling 34, and the trunk 36. Further, speakers 24 are operably connected to amplifier 22 by a means for communicating signals, normally audio cables, but which could also be infrared light, FM signals, or the like.

Referring now to Fig. 2, there is shown a side view of a sportsbike-type motorcycle 10 equipped with motorcycle sound system 12 according to the most preferred embodiment of the

present invention. When integrated in sportsbike 10, the system 12 does not alter the appearance of the motorcycle and cannot be observed by passers-by.

Referring now to Fig. 3, there is shown the placement of the various elements of a motorcycle sound system 12 according to a preferred embodiment of the present invention on a sportsbike-type motorcycle 10. It is an important feature of the present invention that the profile and appearance, and therefore performance characteristics, are not changed by the integration of system 12 with sportsbike 10. It is also significant that more than one pair of speakers 24 can optionally be used in system 12, as shown in this embodiment of the present invention.

Further, optional elements can be added to sound system 12; these can include, but are not limited to, infrared- or FM-signal remote control unit 38 with remote control signal receiver 40, and helmet-mounted speakers 42 with remote control signal receiver 44.

Referring now to Fig. 4, there is shown the placement of the various elements of sportsbike sound system 12 inside cowling 34 according to a preferred embodiment of the present invention. Cowling 34 is dimensioned so as to be large enough to receive audio component 18, amplifier 22, any auxiliary audio component 20, and, if desired, speakers 24. Capacitor 16 can be included in cowling 34, trunk 36, or mounted beneath trunk 36 and above the rear wheel. It is an important advantage of the present invention that the system 12 as shown in Fig. 4 can be packaged as an aftermarket option for commercially-available sportsbike 10 and attached without significant modification of sportsbike 10, since cowling 34 is preferably selected from commercially available options from the manufacturer of sportsbike 10.

It will be apparent to those knowledgeable in the field of motorcycle sound systems that many modifications and substitutions can be made to the foregoing preferred embodiment

LIST OF REFERENCE NUMBERS

	sportsbike-type motorcycle	10
	motorcycle sound system, generally	12
	battery	14
5	capacitor	16
	audio component	18
	auxiliary audio component	20
	amplifier	22
	speakers	24
10	rearview-mirror casings	26
	turnsignal casings	28
	brakelight casings	30
	fairings	32
	cowling	34
15	trunk	36
	remote control unit	38
	remote control signal receiver	40
	helmet-mounted speakers	42
	remote control signal receiver	44